

CLAIMS

1. A method for rasterizing an image on a display that is divided into a plurality of selected regions, wherein the image is decomposed into one or more convex polygons, each convex polygon defined a plurality of original edges, wherein each original edge is defined by a first vertex and a second vertex, the method comprising the steps of:

truncating coordinates of the first vertex to a preselected precision, the truncated coordinates of the first vertex defining a first truncated vertex;

truncating coordinates of the second vertex to the preselected precision, the truncated coordinates of the second vertex defining a second truncated vertex;

generating coordinates for a first modified vertex by adjusting the first truncated vertex according to characteristics of the original edge;

generating coordinates for a second modified vertex by adjusting the second truncated vertex according to the characteristics of the original edge, wherein the first modified vertex and the second modified vertex defining a modified edge for each original edge; and

if a first selected region intersects a second region defined by the modified edges, then refreshing the first selected region on the display.

2. The method of claim 1, further comprising the steps of:

receiving the coordinates for the first vertex of an original edge; and
receiving the coordinates for the second vertex of the original edge.

3. The method of claim 1, wherein the step of truncating coordinates of a first vertex further comprising the step of eliminating a fractional part of the coordinates of the first vertex.

4. The method of claim 1, wherein the step of generating coordinates for a first modified vertex further comprising the steps of:

if the original edge touches a top vertex of the convex polygon, then assigning a true condition to a first element, otherwise assigning a false condition to the first element;

if the original edge is on left of the interior of the convex polygon, then assigning a true condition to a second element, otherwise assigning a false condition to the second element;

if the original edge has a negative slope, then assigning a true condition to a third element, otherwise assigning a false condition to the third element;

if the first truncated vertex and the second truncated vertex defines an edge parallel to a x-axis, then assigning a true condition to a fourth element, otherwise assigning a false condition to the fourth element;

if the first truncated vertex and the second truncated vertex defines an edge parallel to a y-axis, then assigning a true condition to a fifth element, otherwise assigning a false condition to the fifth element;

deriving a first pair values based on the first element, the second element, the third element, the fourth element, and the fifth element; and

adding the first pair values to the truncated coordinates of the first vertex.

5. The method of claim 1, wherein the step of generating coordinates for a first modified vertex further comprising the steps of:

retrieving a first pair values from a table; and

adding the first pair values to the truncated coordinates of the first vertex.

6. The method of claim 1, wherein the convex polygon is a triangle.

7. The method of claim 1, wherein the convex polygon is a convex quad.

8. A table for deriving adjustment values for coordinates of truncated vertices, the table being used in rasterizing computer graphics, the table comprising a plurality of entries wherein each entry having a top vertex indicator, a left region indicator, a negative slope indicator, a x-axis parallel indicator, a y-

axis parallel indicator, a top pair adjustment values, and a bottom pair adjustment values.

9. The table of claim 8, wherein the x-axis parallel indicator may indicate one of the following conditions: true, false, or ignore.

10. The table of claim 8, wherein the y-axis parallel indicator may indicate one of the following conditions: true, false, or ignore.

11. A computer readable medium on which is stored a computer program that rasterizes an image on a display that is divided into a plurality of selected regions, wherein the image is decomposed into one or more convex polygons, each convex polygon being defined by a plurality of original edges, wherein each original edge is defined by a first vertex and a second vertex, the computer program comprising instructions, which when executed by a computing device performs the steps of:

truncating coordinates of the first vertex to a preselected precision, the truncated coordinates of the first vertex defining a first truncated vertex;

truncating coordinates of the second vertex to the preselected precision, the truncated coordinates of the second vertex defining a second truncated vertex;

generating coordinates for a first modified vertex by adjusting the first truncated vertex according to characteristics of the original edge;

generating coordinates for a second modified vertex by adjusting the second truncated vertex according to the characteristics of the original edge, wherein the first modified vertex and the second modified vertex defining a modified edge for each original edge; and

if a first selected region intersects a second region defined by the modified edges, then refreshing the first selected region on the display.

12. The computer program of claim 11, further comprising the steps of:

receiving the coordinates for the first vertex of an original edge; and receiving the coordinates for the second vertex of the original edge.

13. The computer program of claim 11, wherein the step of truncating coordinates of a first vertex further comprising the step of eliminating a fractional part of the coordinates of the first vertex.

14. The computer program of claim 11, wherein the step of generating coordinates for a first modified vertex further comprising the steps of:

if the original edge touches a top vertex of the convex polygon, then assigning a true condition to a first element, otherwise assigning a false condition to the first element;

if the original edge is on left of the interior of the convex polygon, then assigning a true condition to a second element, otherwise assigning a false condition to the second element;

if the original edge has a negative slope, then assigning a true condition to a third element, otherwise assigning a false condition to the third element;

if the first truncated vertex and the second truncated vertex defines an edge parallel to an x-axis, then assigning a true condition to a fourth element, otherwise assigning a false condition to the fourth element;

if the first truncated vertex and the second truncated vertex defines an edge parallel to a y-axis, then assigning a true condition to a fifth element, otherwise assigning a false condition to the fifth element;

deriving a first pair values based on the first element, the second element, the third element, the fourth element, and the fifth element; and

adding the first pair values to the truncated coordinates of the first vertex.

15. The computer program of claim 11, wherein the step of generating coordinates for a first modified vertex further comprising the steps of:

retrieving a first pair values from a table; and

adding the first pair values to the truncated coordinates of the first vertex.

16. The computer program of claim 11, wherein the convex polygon is a triangle.
17. The computer program of claim 11, wherein the convex polygon is a convex quad.
18. A system for rasterizing on a display a convex polygon with a plurality of original edges, wherein each original edge is defined by two vertices and each original edge derives a modified edge, the modified edge is used to determine whether a selected region of the display intersects the corresponding edge, the system comprising:
 - a controller;
 - a rasterizer connected to the controller;
 - a display interface unit connected to the rasterizer, the display interface unit receiving rasterized data from the rasterizer and transmitting the rasterized data to a display unit; and
 - a storage unit for storing data used during the rasterization process, wherein the rasterizer being capable of rasterizing an image on the display device divided into a plurality of preselected regions, wherein the image is decomposed into one or more convex polygons, each convex polygon defined a plurality of original edges, wherein each original edge is defined by a first vertex and a second vertex, by executing the steps of:
 - truncating coordinates of the first vertex to a preselected precision, the truncated coordinates of the first vertex defining a first truncated vertex;
 - truncating coordinates of the second vertex to the preselected precision, the truncated coordinates of the second vertex defining a second truncated vertex;
 - generating coordinates for a first modified vertex by adjusting the first truncated vertex according to characteristics of the original edge;

generating coordinates for a second modified vertex by adjusting the second truncated vertex according to the characteristics of the original edge, wherein the first modified vertex and the second modified vertex defining a modified edge for each original edge; and

if a first selected region intersects a second region defined by the modified edges, then refreshing the first selected region on the display.

19. The system of claim 18, wherein the rasterizer further executes the steps of:

receiving the coordinates for the first vertex of an original edge; and receiving the coordinates for the second vertex of the original edge.

20. The system of claim 18, wherein the step of truncating coordinates of a first vertex further comprising the step of eliminating a fractional part of the coordinates of the first vertex.

21. The system of claim 18, wherein the step of generating coordinates for a first modified vertex further comprising the steps of:

if the original edge touches a top vertex of the convex polygon, then assigning a true condition to a first element, otherwise assigning a false condition to the first element;

if the original edge is on left of the interior of the convex polygon, then assigning a true condition to a second element, otherwise assigning a false condition to the second element;

if the original edge has a negative slope, then assigning a true condition to a third element, otherwise assigning a false condition to the third element;

if the first truncated vertex and the second truncated vertex defines an edge parallel to an x-axis, then assigning a true condition to a fourth element, otherwise assigning a false condition to the fourth element;

if the first truncated vertex and the second truncated vertex defines an edge parallel to a y-axis, then assigning a true condition to a fifth element, otherwise assigning a false condition to the fifth element;

deriving a first pair values based on the first element, the second element, the third element, the fourth element, and the fifth element; and

adding the first pair values to the truncated coordinates of the first vertex.

22. The system of claim 18, wherein the step of generating coordinates for a first modified vertex further comprising the steps of:

retrieving a first pair values from a table; and

adding the first pair values to the truncated coordinates of the first vertex.

23. The computer program of claim 18, wherein the convex polygon is a triangle.

24. The computer program of claim 18, wherein the convex polygon is a convex quad.